

# FRAMING AND BIAS: A LITERATURE REVIEW OF RECENT FINDINGS

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## Abstract

Framing bias is an individual decision-making misconception caused by the fact that a person interprets the surrounding world according to a decision frame chosen by her or his subjective opinion. This article aims to review various kinds of factors that cause and affect framing or lead to debiasing, i.e. a decrease in the resulting framing bias. The objective of the study is carried out using a literature review that analyzes recent empirical studies. As a result, numerous factors are identified that according to the studies have an impact on framing. It transpires that four broader groups of these factors can be established – decision situation setup (amount of information, additional presentation of options), experience (knowledge, engagement), effort (attention, complexity, the amount of information to process) and demographics (gender, nationality).

## Key words

Framing, framing bias, debiasing, literature review

## Introduction

The literature building upon neoclassical economic theory (i.e. authors like Friedman, von Neumann, or Morgenstern) considers man to be a rational being, which allows neat mathematical analysis of human decision-making. However, such a full rationality put huge demands on decision-making. Among them, that decision-makers choices should also be consistent regardless of the way individual options are formulated. However, in reality, people make decisions that deviate due to number of factors from a rational choice. One factor plays a role in this is framing (Tversky and Kahneman, 1974; Levin et al., 1998), which is the subject of this article.

Goffman (1986) argues that people interpret the surrounding world according to the primary frame they choose based on their subjective opinions. The primary frame is one that is considered to render what would otherwise be an insignificant aspect of the scene into something that is meaningful. Russo and Schoemaker (1989) also point out that framing is about the mental structure which people create to organize and simplify the world. Plous (1993) describes the framing effect by suggesting that people respond differently to the choices offered to them depending on the form the speaker uses to give her or his speech and the way of presentation of individual options. The key element of framing is the reference point which is used for evaluating events that may result from a decision - a typical reference point may be current profit level (Thaler, 1999) or target income (Camerer et al., 1997). Changes to this reference point can have a major impact on the way a judgment is assessed, and thus on a chosen procedure (Kahneman and Tversky, 1979).

In the experimental situation known as the Asian disease problem, Tversky and Kahneman (1981) examine framing and the resulting framing bias of a decision-maker. They conclude, based on results of their experiment, that if people have an option that is interpreted positively, from the side of gains, they tend to choose a variant that is less risky than when individual options are formulated negatively as potential losses. In addition to framing in the Asian disease problem, Levin et al. (1998) mention two other types of frame manipulation: (i) framing of an attribute, i.e. a description of characteristics of one thing in a positive or negative light; and (ii) framing a goal and highlighting an achievement as gains or losses caused by a certain behavior.

The framing of options and situations is a subject of further research (e.g. Baumeister et al., 2001; Rozin and Royzman, 2001), in which the term negativity bias is introduced. Negativity bias stems from conclusions that “bad has a stronger effect than good” in various situations, whether in creating impressions, perceptions, memories, or decision-making (as reflected more generally by prospect theory, Kahneman and Tversky, 1979). In general, Janiszewski et al. (2003) argue that since framing in decision-making often involves information from human’s unconscious memory, it is very difficult to prevent its influence on decision-making.

## **Methodology**

We search for literature using systematic review approach in order to offer a systematic, transparent and reproducible process (Cook et al., 1997). This process minimizes distortions through a detailed literature search of published and unpublished studies, which is accompanied with a listing of decisions, procedures and results. This article aims to find and analyze recent empirical experimental research on framing bias. The search uses the criteria described below. After the search, individual factors affecting framing are compiled in an overview using more traditional narrative process. The research question is: “Which recently studied factors in experiments influence (both by creating or reducing) framing of decisions and the resulting framing bias?” The EBSCOhost database is chosen as the source of the search for publications. The key words used in the search query are framing, bias and experiment. Additionally, the search is aimed at articles written in English and, in order to review the most recent literature on the topic, published from 2005 until May 2017. The resulting number of identified resources is 123.

From the resources found by the criteria mentioned above, we first remove duplicates and have 75 articles. Another round of screening focuses on an assessment of whether the research is directly focused on framing bias testing, or uses the framework as just a part of methodology for conducting an experiment about a different topic. We make this decision based on examination of abstracts, discussions and conclusions of the articles. The number of relevant articles fulfilling our criteria is 34. Finally, after analyzing whole articles, we make the final list of 21 articles (Table 1) that not only address framing, but also analyze factors influencing its resulting magnitude.

Authors (Year)	Title	Factors affecting the size of framing effect	Country
Schuck and de Vreese (2006)	Between Risk and Opportunity - News Framing and its Effects on Public Support for EU Enlargement	Experience and previous knowledge, engagement	EU
Park and Rothrock (2006)	Systematic analysis of framing bias in missile defense: Implications toward visualization design	Planning and complexity of assignment, processing, consideration; Visualization of decision impacts	USA
Gamliel (2007)	To Accept or to Reject: The Effect of Framing on Attitudes Toward Affirmative Action	No impact of belonging to a group	Israel
Nan (2007)	Social Distance, Framing, and Judgment: A Construal Level Perspective	No impact of belonging to a group	USA
Rucker, Petty and Briñol (2008)	What's in a frame anyway?: A meta-cognitive analysis of the impact of one versus two sided message framing on attitude certainty	Two-sided messaging	USA, Spain
Agnew, Anderson, Gerlach and Szykman (2008)	Who Chooses Annuities? An Experimental Investigation of the Role of Gender, Framing, and Defaults	Gender	USA
Van Buiten and Keren (2008)	Speaker-listener incompatibility: Joint and separate processing in risky choice framing	The order in which an assignment is given; How many options are seen	Netherlands
Cheng and Wu (2010)	Debiasing the framing effect: The effect of warning and involvement	Experience and previous knowledge, engagement	Taiwan
Kühberger and Wiener (2012)	Explaining Risk Attitude in Framing Tasks by Regulatory Focus: A Verbal Protocol Analysis and a Simulation Using Fuzzy Logic	Attractiveness of the risky variant / method of evaluation	Austria
Hilbig (2012)	How framing statistical statements affects subjective veracity: Validation and application of a multinomial model for judgments of truth	Attractiveness of the risky variant / method of evaluation	Germany
Huerta, Glandon and Petrides (2012)	Framing, decision-aid systems, and culture: Exploring influences on fraud investigations	Demographic and cultural impact	USA, Mexico
Meissner and Wulf (2012)	Cognitive benefits of scenario planning: Its impact on biases and decision quality	Planning and complexity of assignment, processing, consideration	Germany
Ert and Erev (2013)	On the descriptive value of loss aversion in decisions under risk: Six clarifications	Attractiveness of the risky variant / method of evaluation	Israel
Gamliel and Kreiner (2013)	Is a picture worth a thousand words? The interaction of visual display and attribute representation in attenuating framing bias	Assignment visualization	Israel
Kencono Putri, Baridwan and Nahartyo (2013)	Risk Information Impact on Investment Decisions: Experimental Test of PMM Theory, a Case of Indonesia	Demographic and cultural impact	Philippines
Cheng, Wub and Lin (2014)	Reducing the influence of framing on internet consumers' decisions: The role of elaboration	Planning and complexity of assignment, processing, consideration	Taiwan
Jefferies-Sewell, Sharma, Gale, Hawley, Georgiou and Laws (2014)	To admit or not to admit? The effect of framing on risk assessment decision making in psychiatrists	Experience and previous knowledge, engagement; Gender	Great Britain
Olsen (2015)	Citizen (Dis)satisfaction: An Experimental Equivalence Framing Study	Experience and previous knowledge, engagement; The order in which an assignment is given	Denmark
Schwitzgebel and Cushman (2015)	Philosophers' biased judgements persist despite training, expertise and reflection	Experience and previous knowledge, engagement	USA
Kang and Lin (2015)	Effects of Message Framing and Visual-Fear Appeals on Smoker Responses to Antismoking Ads	Experience and previous knowledge, engagement; Assignment visualization	Korea, USA
Oganian, Korn and Heekeren (2016)	Language Switching — But Not Foreign Language Use Per Se — Reduces the Framing Effect	Language change	Germany

Source: Systematic search by authors

**Table 1: Overview of articles reviewed**

## Literature review

Based on review of identified articles we formulate four groups of factors involved in framing – decision situation setup, experience, effort and demographics. The first group of factors, decision situation setup (apart from general positive or negative framing of options) plays an important role. As mentioned in the introduction, framing is related to a decision-maker's conception of risk (Tversky and Kahneman, 1979). A weak framing effect is observed in cases where the risky option is relatively unattractive (Ert and Erev, 2013). Higher attractiveness increases framing bias when both options are equally attractive in relative terms. Increasing rewards also raises the framing bias. People make higher-risk decisions if they can get more - even if it is the same amount, i.e. only calculated in a different currency. In Ert and Erev's (2013) experiment, people can get 10 shequels or 1000 agoras (with 1 shequel = 100 agoras), and yet the framing bias for agoras is higher. Hilbig (2012) found that there is also an influence depending on whether a reward is paid or whether it is stated as a number or percentage. The link between reward and the attractiveness of a high-risk option is confirmed by Kühberger and Wiener (2012). They claim that people are affected by the bias regarding how much money they want to save. If their minimum amount can only be reached by choosing a high-risk option, then they choose this option regardless of how the assignment is framed because it is considerably more attractive for them.

Other example of factor in situation setup is so-called "two-side framing" in which, for example, some negative information is contained in a positive message (Rucker et al., 2008). Two-side framing reduces the resulting framing bias as it gives people the feeling that they have more information about the subject. Experiments of Eisend (2006) support this claim as two-side framing increases the perceived credibility of a source. Similarly, Arbuthnott and Scerbe (2016) note that mentioning the negative aspects of solutions increases a feeling of transparency. In addition, Olsen (2015) finds that framing bias is also influenced by order of the information presented, where the initial exposure to positive information weakens the susceptibility to negative framing, but not vice-versa. Van Buiten and Keren (2009) also support the diminishing effect of framing based on the order of information when they try to discover which assignments (positively or negatively framed) speakers choose when trying to convince listeners about their statements. When these assignments are presented to the speaker one after the other, and not at the same time, the speakers presenting higher-risk solutions assume that their listeners would be more easily convinced when their speech is negatively framed. In these experiments, the impact of the number of options is also highlighted. As opposed to speakers, listeners are largely affected by the framing because they receive only one option for solving a problem, i.e. they receive less information (Van Buiten and Keren, 2009). From these studies, one can infer that additional information about an area, or at least the feeling that the decision-maker has more information leads to a reduction in the framing effect.

In real life, more information on the subject is rather the result of experience, past knowledge or engagement in the area of decision-making. Indeed, numerous authors show that this group of factors considerably affects the decision in term of the framing effect. Kang and Lin (2015), for example, test the impact of a positive/negative framing in a message that mentions the harmful impacts of smoking on health. They find that framing has no effect on reactions of people who are smoking. Similarly, an experiment by Cheng and Wu (2010) shows that people with high engagement in a subject matter are less sensitive to the impact of information framing, as they tend to look at the information more thoroughly. Likewise, Olsen (2015),

who studies citizens' opinions on hospital facilities, concludes that people who had worked in hospitals in the past or had other personal experience with them are not influenced by a negative framing. In fact, they judge hospitals just like those who never had any experience with hospitals and are presented with a positive framing. Similarly, a general awareness of politics is considered to be one of the reasons why certain respondents are not influenced by framing in Schuck and De Vreese's (2006) EU-risk experiment. In the research by Jefferies-Sewell et al. (2015), on the basis of negatively framed information less-experienced psychiatrists choose to accept a psychiatric patient for treatment more often than experienced ones. Based on a number of the studies, it clearly seems that experience and personal engagement diminish the effect of framing on decision making. On the other hand, it is important to note contrasting findings by Schwitzgebel and Cushman (2015) who test the impact of framing bias in an Asian disease problem-like experiment. In the experiment, they compare the answers of philosophers with years of experience in the field with "non-professionals" (people with a similar level of education but from other fields) and prove a presence of framing bias and risk-aversion among participants from the philosophers' group. However, even the authors agree with the statement that experience and knowledge of a subject under consideration reduce the impact of framing and framing bias.

Nevertheless, reaching a decision that is subsequently minimally affected by framing bias, can be accomplished even if there is insufficient information about a problem simply by putting more effort into decision-making. Meissner and Wulf (2013) investigate the impact of complexity and planning in decision-making. According to them, the preparation of variants of a future situation reduces the impact of framing bias by broadening the decision-maker's overview of it. Cheng et al. (2014) support them by acknowledging a debiasing effect of information processing or the consideration of circumstances which force participants to better process and rationally review their decisions while considering other alternatives. Park and Rothrock (2006) also find out that the impact of framing bias is reduced by the complexity of a decision together with time pressure. At the same time, the visualization of the impact of a decision (i.e. getting feedback) has also shown to have a debiasing effect. Unlike this finding, the visualization of the assignment does not affect the framing bias (Gamliel and Kreiner, 2013). On the other hand, Park and Rothrock's (2006) visualisation effect contradicts the results of Kang and Lin's (2015) experiments with smokers. These authors find that images of healthy and cancer-affected lungs do not have an impact on smokers because the high-risk option (to keep smoking) is too important to them.

Generally, the attractiveness of options can also be affected by demographic factors such as our cultural habits, group affiliation or gender. Kencono Putri et al. (2013) find that due to some cultural habits people are not subject to framing bias at all. Participants in their study choose a non-risk option for positively framed information (this is in line with the framing theory), but in the case of negatively framed information, they choose the lowest risk option (that contradicts the theory which assumes that in such a situation they would choose a high-risk one). The authors' explanation lies in the cultural traditions (the sample consists of Indonesian respondents) and risk aversion in the given security market. This is further supported by Huerta et al. (2012) who state that the nationality of respondents and the associated habits in a given country have a significant impact on the resulting framing bias. Oganian et al. (2016) identify a debiasing effect of formulating instructions in a different language than options – as solving a situation cause transitional changes in cognitive control.

Similarly to the nationality, affiliation to a particular social groups has a certain, although not clear, impact on framing bias. The influence of positive framing differs depending on social distance (affiliation to a group), but the effect does not change proportionally to it (Nan, 2007). The framing effect is not weaker when people judge someone from a more distant social group, but differs between the particular levels of distance. In Nan's (2007) experiments, message framing has a stronger impact when it relates to a best friend than a colleague, but on the other hand, it is stronger when it relates to a colleague than a decision-maker. Similarly, as Gamliel (2007) describes, even if a member of a certain group is preferred to a certain position, it does not matter whether this decision is made by members of a given group or members of another group – the framing of an assignment has the same impact on both.

Numerous experiments demonstrate that gender plays a role in reactions to framing. Agnew et al.'s (2008) research on investment shows that both sexes tend to opt to invest if they receive negatively framed information about retirement savings, while only men choose to save if they receive negatively framed investment information. According to the authors, one possible explanation is the fact that women are more risk-averse than men, so they prefer to choose a safer option, which is saving for a pension in this case. However, if they have more information about the investment, they choose to invest directly and they are no longer affected by framing bias. Similarly, in the field of psychiatry (i.e. in situations where we can consider decision-makers to be educated), female doctors are less influenced by framing than males (Jefferies-Sewell et al., 2015).

## Discussion

In the review, individual debiasing factors affecting framing are grouped into several categories, with previous experience and knowledge in an area having the most frequent effect on reducing framing bias. According to numerous authors (e.g. Dutt et al., 2013; Gonzalez, 2013; Harman and Gonzalez, 2015), most of the biases created during the first contact with a description of a situation are weakened or completely disappear if the selection is based on experience. Huerta et al. (2012) describe this phenomenon as preferences developing by experience. Nevertheless, even expertise in the field does not automatically guarantee a reduction in the framing bias, as it is shown by Schwitzgebel and Cushman (2015), whose findings mostly contradict the ones above. They mention Mandel's (2014) argument that participants in the Asian disease experiment can read the option "200 people to be saved" as "at least 200 people will be saved" (perhaps more) and comparable "400 people die" as "at least 400 people die", leading to the choices of participants that are different than expected. Another problem may be the fact that for problems like the Asian-disease experiment, it is not possible to test how correct an answer is. It is, after all, only a moral choice. All these arguments leads to questioning of validity of experimental findings (note number of factors affecting framing on decision situation setup).

Possibly even more important is the discussion on whether framing is biased or not. In this text, we distinguish between framing and framing bias. Framing generally refers to a process of decision-making, namely the "decision-maker's conception of the acts, outcomes, and contingencies associated with a particular choice" (Tversky and Kahneman, 1981: 453) involved in this process. Framing bias, on the other hand, refers to the possible variation in the outcomes of decision-making, resulting in a deviation from a rational choice. Both terms are linked to each other, i.e. the process leads to bias, yet it is important to distinguish between them.



There is a logical argumentation that framing does not always have to result in an irrational and therefore biased behavior, as the two statements/options can logically be equivalent, but not necessarily informatively equivalent (McKenzie and Nelson, 2003, Sher and McKenzie, 2006). A person, for example, can gain or lose points in an exam. However, should the opposite of “gaining” be “not gaining”? Alternatively, is the opposite of “losing” “not losing”? All this should be again acknowledged in the methodology of empirical framing research and especially in the interpretation of findings.

As a topic for further research, we suggest a focus on the role of attention, similarly to, e.g. attention-based view in strategic management (Ocasio, 1997). The complexity of choices, a different perspective and changing the language in an assignment and options, can be linked to the need to put more effort (and therefore attention) into a decision-making process. There may be other possible explanations, and further research may shed more light on this issue. Beside this, studying the influence of nationality on framing in decision-making may also be beneficial. Especially if such a cross-cultural study involves a larger number of different nationalities to ensure generalizable findings (Franke and Richey, 2010).

The limitations of this article stem mainly from using one database for the search, leading to the possible omission of some articles. On the other hand, we believe that risk of this omission is limited by the general nature of the database selected. The time frame for the systematic review and the exclusive use of the English language also may have restricted us from a more complex study of framing and framing bias. However, our foremost goal is to review recent research on this widespread topic in decision-making and therefore we do not strive to review all the countless studies on framing.

## **Conclusion**

The goal of this review is to find the factors that influence effects of framing in experiments. Probably the most significant factors are previous experience or knowledge that together with an individual's engagement in a topic significantly reduce framing bias. The participants' resilience to this effect is also influenced by additional information given to them that, combined with the complexity of the data and planning, broaden their perspectives and enables them to have a more objective view of the issue and lead them to put more effort into decision-making. On the other hand, there is no clear debiasing effect on decision-makers of the visualization of the options. Whether a participant is influenced by framing also depends on the rewards got for different options. The consequences of rewards do not only depend on the value, but also on the way in which the rewards are described. Finally, demographic factors distinguish decision-makers' predispositions for framing bias. Nationality and certain national customs have a debiasing effect. According to the findings, women are naturally more risk-averse and, therefore, subject to framing. Beside that, affiliation to certain groups does not change framing bias. In sum, it seems that at least four broad groups of factors influence framing – decision situation setup (amount of information, additional presentation of options), experience (knowledge, engagement), effort (attention, complexity, the amount of information to process) and demographics (gender, nationality).

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